

Biological Evaluation  
Mountain Pine Beetle Infestation

Cassia Division, Twin Falls Ranger District  
Sawtooth National Forest  
1975

By

Arland Valcarce

Introduction

A request was received from the District Ranger, Twin Falls District, through the Forest Supervisor, Sawtooth National Forest, for input into the Cassia Division timber sale proposal being developed by the Sawtooth ID team. An outline of this proposal is attached. Boise I&DC zone office staff was to determine future trend of a current mountain pine beetle epidemic in lodgepole pine in the sale area; to evaluate accumulated losses and to estimate future volume changes that inevitably will be caused by the beetle. In other words--the volume is there now as determined from timber reconnaissance by Gary Kaiser\* and David McClymonds.\* How long will it last consistent with the alternative of removing 10 MMBF yearly for 10 years? This report basically attempts to answer this question. Other alternatives that consider removal of lesser volumes are automatically covered.

General Information

Insect: Mountain pine beetle, Dendroctonus ponderosae Hopkins.

Host Tree: Lodgepole pine, Pinus contorta Douglas.

Location: Cassia Division of the Sawtooth National Forest.

Type of Damage: Killing of mature and overmature trees. Age class 30 to 120 years.

Extent of Epidemic: Throughout approximately 22,000 acres of lodgepole pine sawtimber type. Heaviest impact has occurred on the west side of the division from Shoshone Basin to Pike Mountain.

\*Forestry Technicians (graduate foresters) Sawtooth NF.

### Sampling Procedures

Stand and beetle trend information were obtained from Forest timber reconnaissance and completed cruising data within 21 of 74 compartments in the Cassia Division and from a ground survey that was completed the first two weeks in September by Kaiser, McClymonds and Valcarce. During the ground survey 84 variable plots were taken representing all of the sawtimber type using a Relaskop at BAF 20. Each "in-tree" was classified into one of four categories and recorded: (1) Live(L), (2) killed in 1974 (current red-tops) (74), (3) killed in 1975 (remain green until '76) (75) and (4) older dead trees (OD).

### Biological Information

Mountain pine beetle outbreaks have been followed through their climaxes in several areas of eastern Idaho and western Wyoming by different workers to determine total tree and volume impact caused by this insect. Generally these studies have shown that losses in lodgepole pine can vary anywhere from 10 to 50 percent of the trees (over about 6 inches dbh) and upwards of 50 to 70 percent of the merchantable volume. An epidemic may slowly reach a peak over several years' time after which more than 50 percent of total trees killed may occur over the next two or three years and the epidemic subsides.

Beetle epidemics are sustained by large trees with thick inner bark (phloem). There is a correlation between phloem thickness and size of brood production as shown by Cole and others. Many smaller trees are killed by brood produced in larger trees.

Character of stands in the Cassia are different from the endless contiguous lodgepole type in those areas mentioned. Total acreage is comprised of hundreds of isolated individual stands, at high elevation, separated by wide expanses of grass-sagebrush or aspen type. Losses are variable, intermittent and are occurring over longer periods of time.

### Results

Analysis of the ground survey data based on 84 plots showed it to be statistically sound for green stand and gross volumes and that these data were not significantly different from reliable compartment examination data measured by Kaiser and McClymonds. Even though the analysis showed more plots were needed to produce better reliability for '75, '74 and OD, a tree loss trend was shown that compared favorably with percent lost from the compartment examination work completed.

A breakdown of stand data shows the following currently existing volumes in each tree classification:

Existing Sawtimber Volumes Cassia Division (bf/a)

<u>Current</u> <u>Live</u>	<u>Dead</u> <u>1974</u>	<u>Dead</u> <u>1975</u>	<u>OD</u>	<u>Total</u>
12,470	1,076	925	3,231	17,702

Total Board Foot Volumes Based on an Estimated 22,000 Acres

<u>Live</u>	<u>1974</u>	<u>1975</u>	<u>OD</u>	<u>Total</u>
274,340,000	23,672,000	20,350,000	71,082,000	389,444,000

Discussion

Table I shows predicted live, dead and gross volumes that will remain in residual stands should a 50, 60 or 70 percent volume loss occur over the next 4 to 5 years.

Table I. Live and Dead Volumes at 50, 60 and 70 Percent Loss Rates.

<u>50% Loss</u>		
<u>Live</u>	<u>Dead</u>	<u>Total</u>
194,722,000 8,851/a	194,722,000 8,851/a	389,444,000 17,702/a

<u>60% Loss</u>		
<u>Live</u>	<u>Dead</u>	<u>Total</u>
155,778,000 7,081/a	233,666,400 10,621/a	389,444,000 17,702/a

<u>70% Loss</u>		
<u>Live</u>	<u>Dead</u>	<u>Total</u>
116,833,200 5,311/a	272,610,800 12,391/a	389,444,000 17,702/a

Amount of damage to individual stands will vary depending on stand structure. Many of the high volume stands show a dense stocking of predominantly small diameter sawtimber with perhaps 10 inches as the upper size class although larger trees occur on the edges. Dense, small sawlog stands should be more "beetle proof" and sustain lower losses than uniformly large sawlog stands. The small diameter stand will continue to sustain mortality as long as large diameter stands are in the proximity.

Overall the west side of the Cassia has sustained about 40 percent volume loss to date including 1975 beetle attacks. Infestations in this area, from Pike Mountain west to Shoshone Basin, appear to be subsiding and total volume lost may not go over 50 percent. All stands east of Pike Mountain average about 20 percent loss through 1975. What is surprising is that beetle infestations have been continuous, as noted from the annual aerial surveys, in that part of the east side from the third fork of Rock Creek to Badger Mountain for 10 years. Observations on the ground show considerable local fluctuation in tree killing intensity the past several years. Many stands show no new attacks yet show older beetle-killed trees. Other stands show continuing beetle attacks. East side stands should suffer no greater losses than the west side and will probably not go over 50 percent. A factor that is slowing the rate of loss is that most remaining high volume stands are growing at relatively high elevation; most are 7,000 feet or slightly higher. Smaller effective beetle broods are produced at high elevation due mainly to low temperatures. High incidence of woodpecker activity was noted on 1974 attacked trees. Very low beetle emergence was indicated from such trees and there was below normal emergence from trees that showed no woodpecker activity. Current beetle broods in 1975 attacks were normal on the east side and low or poor on the west side. Beetle activity measured by attack ratios shows a decreasing trend in the east and west and an increasing trend in the central part. Overall a slightly decreasing trend was shown.

In view of researched information and on-the-ground conditions that have been stated we have made some projections of stand changes that we feel are realistic. We believe that no more than 50 percent of the volume will be lost in the various stands as a whole. In addition, we estimate it will be approximately five years before this total volume loss occurs.

Reference to Table I shows that with a 50 percent loss projected by year 1980, 5 years from now, there will still be over 194 MMBF of live sawtimber remaining. Some stands will sustain higher losses -- these would be shown under 60 and 70 percent. Some stands will undergo less than 50 percent loss and an average is indicated at no greater than 50 percent.

Table II projects the 50 percent loss by years showing live and dead volumes remaining at the end of each successive year through 1980 at which time the epidemic will have reached a climax.

Table II. Projected remaining board foot volumes by years assuming a 50 percent loss by 1980.

	<u>1976</u>	
<u>Live</u>	<u>Dead</u>	<u>Total</u>
274,340,000	115,104,000	389,444,000
	<u>1977 (-21 MMBF)*</u>	
253,340,000	136,104,000	389,444,000
	<u>1978 (-21 MMBF)</u>	
232,340,000	157,104,000	389,444,000
	<u>1979 (-21 MMBF)</u>	
211,340,000	178,104,000	389,444,000
	<u>1980 (-16.6 MMBF)</u>	
194,722,000	194,722,000	389,444,000

\*An arithmetic decrease (beetle loss) of 21 MMBF annually is not unrealistic under Cassia conditions. This is approximately the average losses that occurred in 1974 and 1975.

Table III shows that the acres of clearcuts required to obtain 10 MMBF increases each year, 1976 through 1980, as beetles continue to cause tree mortality toward the 50 percent volume loss. Per acre volumes are reduced each year so that increasing acreage is required to be cut to obtain the same green timber volume annually.

The volume per acre stabilizes with subsidence of the epidemic in 1980 at 8,851 b.f. Each year thereafter 1,129 acres are required to obtain 10 MMBF. At 60 percent loss 1,412 acres and at 70 percent loss 1,882 acres would be required annually, Table IV.

Table III. Acres of Clearcuts Needed to Obtain Green Volume of 10 MMBF/Year for Next 5 Years.

	<u>Projected 50% Volume Loss</u>	
	<u>Acres</u>	<u>Volume</u>
1976	800	(12,470/a)
1977	868	(11,515/a)
1978	946	(10,560/a)
1979	1,041	( 9,606/a)
1980	1,129	( 8,851/a)

Table IV. Acres of Clearcuts Needed to Obtain Green Volume of 10 MMBF/Year (Year 1980 and Beyond).

	<u>50% Dead</u>	
		Volume dead trees on same acres 10 MMBF
1,129 acres/year		
	<u>60% Dead</u>	
1,412 acres/year		15 MMBF
	<u>70% Dead</u>	
1,882 acres/year		23 MMBF

These data indicate a large sale is feasible. Success will depend on a concerted effort to log those stands first that contain the greatest number of the largest diameter trees. This is where the highest number of currently infested trees will also be found. If purchasers are guided to these stands for cutting first, considerable beetle control can be attained each season simply by removing the major cause factor (large trees). Direct beetle control will be accomplished also when infested logs are hauled during any month of the year. Beetle flight occurs from about July 15 to August 20. Even during this period newly infested trees will be hauled.

Timely annual beetle surveys will keep managers informed of current trend. Continuing compartment examinations will add substantially to the data. Knowing what the beetles are doing will make possible re-adjustments and updating of plans each year. Knowing current annual beetle losses will provide for revision of projected losses.

The above relates to accelerated harvest and would place at least half of 22,000 acres of lodgepole pine under management over a 10-year period.

Some effects that may be considered under the alternative of continuing under current management:

1. Similar losses to those projected may be expected to take place.
2. Many east side stands will look like some of the worst stands on the west side in several years if no logging is done in them.
3. Without some intensified timber management the Deadline fire may be an example of what could and may likely happen in the future.

#### Recommendations

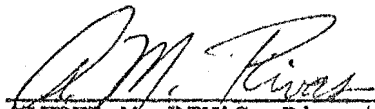
1. Make the large sale.
2. Surveys should be accomplished to locate all sawtimber stands by size classes and arranged in cutting priority of largest to smallest sizes.

Prepared by:



ARLAND C. VALCARCE  
Zone Entomologist

Approved by:



ALFRED M. RIVAS, Director  
Insect and Disease Control



## APPENDIX

REQUEST FOR INPUT FROM FOREST INTERDISCIPLINARY TEAM

Evaluation breakdown of action or proposal on the Twin Falls Ranger District. (D-2)

District Staff will use this form for all requests for I.D. Team input on District proposals. I.D. Team will provide individual functional reports on requested proposal input. Head knocking session summary will be documented by Forest Planner, or his designate.

NAME OF PROPOSAL

Cassia Division Timber Sale Proposal

DESCRIPTION OF PROPOSAL (Brief)

Forest Supervisor directed that we make a determination of the feasibility of making available all mature - overmature, dead and dying, insect infested and diseased timber on the Cassia Division to either existing mills or invite new industry into the area; harvest and utilize the wood fiber thru timber sales, plus other alternatives.

PLANNING OBJECTIVES

1. Remove thru timber sales the mature and overmature timber susceptible to insect infestation or attack to slow down bark beetle infestation.
2. Remove salvable wood fiber (as per Comptroller General's ruling of 1973).
3. Reduce fuel loading i.e. (priority areas - such as ski area) recreation residence areas, administrative sites, organization camps and campgrounds.
4. Maintain recreation use level and appeal in hauling operations.
5. Maintain a sustained yield at present level of post, pole, and fuelwood removal.

STAGE OF DEVELOPMENT OF PROPOSAL

1. From data collected from Forest Timber Recon. Crew, there are approximately 300 million board feet of sawtimber, 8 "DBH, on above available and in the mature - overmature and dying class.
2. Road system is inadequate for large truck removal of timber.
3. Private industry is wanting wood fiber, providing we can give them some assurance of approximately 10 million board feet/year for ten years.
4. Present manpower on D-2 is inadequate to handle a sale program as proposed.

What has been done to date?

1. Some input on Deadline and Balsam Summer Home Area sales have been received from I.D. Team members.
2. Show-me trips have been made with Cliff Miller (Engineer, Regional Office); (Bill Bryan, T.M., Regional Office); and Twin Falls County Commission.
3. Lots of B. S. But no action!!!
4. Timber inventory (partially) done.

TIME TABLE FOR PROPOSAL

Suggested Completion Dates:

	<u>DATES</u>
Field Review -	8/25 - 29/75
Head knocking session -	8/29/75
Functional reports due Team leader (with <u>good</u> pictures) in suitable format for including information in E.A.R. or E.S.	9/12/75
Final Discussion Session -	9/19/75
Completed evaluation and E.A.R. or E.S.	9/30/75

RESOURCE SPECIALIST REQUESTED ON I.D. TEAM

Fred Baugh, Team Leader

<u>Resource</u>	<u>Qualified Representative</u>
1. Range -	Ivan Thornton - Keith Tweedie
2. Lands -	Dee Strickling
3. Timber -	Phil Straub
4. Archeological - History	Art Selin
5. Recreation -	Terry Fletcher
6. Engineering -	Dewayne Ide - Tom Pestotnik
7. Soils - Hydrology	Blaine Molyneaux
8. I and I -	Lew Munson - Wally Schiverdecker - Jack Hougaard

- 9. Fire and Fuels Management - Bill Williams - Jack Exon
- 10. Wildlife - Tom Phillips
- 11. Land Use Planning Co-ordinator - Jack Hougaard

QUESTIONS AND PROBLEM AREAS NEEDING I.D. TEAM INPUT

ENGINEERING:

- 1. Condition of present transportation system for timber hauling and other activities.
- 2. Estimate of reconstruction and construction costs spread over Cassia Division by phase or section for a ten year period. (see map District Forest Ranger has on tentative development of roads in line with proposed T. S. Areas).
- 3. Request preliminary copy of contour (topography ) map of Cassia Division from U.S.G.S. (if available).
- 4. Identify existing capacities of present transportation system (Cassia Division).
- 5. Available dust control agents, alternatives and costs.
- 6. Identify signing requirements for safety and activity information.
- 7. Show alternatives and cost estimates for cut and fill slope stabilization practices. (Co-ordinate with Hydrologist).
- 8. Identify possibility of new route from head of Martindale Creek via head of Third Fork to tie in with Monument Peak road at approximately head of Jones Creek.

TIMBER

- 1. Estimate of volumes, ages, areas, size class, anticipated logging and silviculture systems, and other conditions of timber stands on the Cassia Division.
- 2. Locations of all timber stands 8" DBH plus, for insect evaluation (Knopf) and for transportation system planning.
- 3. Harvest combinations available to meet objective number one for the next ten year period.
- 4. Analysis of current and anticipated market conditions. (All)
- 5. Analyse current mill capacity status.
- 6. Analyse harvest status of timber stands for:

A. Sawtimber

B. Post and poles

C. Fuelwood and other -

7. Analyse other timber activities to be facilitated:

A. Contract timber stand improvement work (Burns 2)

B. Post and Pole

C. Fuelwood and other -

8. In conjunction with District Ranger, determine tentative division sale location areas to be flexible to insect damage.

9. Evaluate regeneration needs and control, i.e. serosity fuel management in cut-over areas, etc.

10. Develop economic analysis of sale activities, i.e. on stumpage, brush disposal, K-V, and erosion control, etc. Portable mills, (garrett ecologizer) and what the Forest and Regional policy is concerning milling on the Forest.

RECREATION - AESTHETICS:

1. Description of timber harvest impacts on recreation use, i.e. - Log haul restrictions, modified logging methods, land adjacent to campgrounds need for oil dust palliative. Recreation site and administrative sites need for oil dust palliative adjacent to work areas also.

2. Impacts of insects on recreation use.

3. Assist D.F.R. by furnishing visual inputs for stratification of timber stands as input to Forest Timber Management Plan and for September 30 report to Regional Office.

4. Alternatives for cover in campgrounds, inventoried sites, and administrative sites, such as other timber species.

RANGE:

1. Cattleguard and fence locations and/or modifications needed within sale areas (cattle and sheep).

2. Co-ordination needed with timber regeneration units (in plantings and natural regenerating areas).

3. Co-ordination with all cattle and sheep allotment permittees on modifying use on allotments. (Related to timber sales)

4. Describe vegetative condition prior to and after timber harvest (what can be expected).

5. Economic analysis of alternatives.

#### FIRE and FUEL MANAGEMENT:

1. Fuel conditions (current and future fuel loading).
2. Anticipated impacts and costs for additional manpower in relation to prevention and suppression with or without timber harvest.
3. Costs of alternative fuel treatment prescriptions, i.e. - burying, chipping and shaded fuel breaks, etc.
4. Revised location of equipment and personnel, i.e. - Pumpers and suppression crews?
5. Update preattack planning.

#### WILDLIFE:

1. Inventory of birds (endangered and threatened), mammals dependent upon habitat existing on Cassia Division.
2. What impacts are critical on maintaining game habitat - size of cutting units; cover; food; etc.
3. Timber harvest impacts on Beaver habitat.
4. Idaho Fish and Game Department inputs.
5. Do part of writing job -

#### SOIL and WATER:

1. Complete Soil and Hydrologic survey or analysis.
2. Assist on location of roads (Co-ordinate with Engineers)..
3. Identify areas where special slope stabilization measures will be needed.
4. Recommended road closures (Due to soil stability, problems, costs, and unavoidable impacts).
5. Effects of logging on soil compaction and water quality.

#### LANDS:

1. Check Status of Road R/W:
  - A. Shoshone Basin - Section 13, 24, T14S, R17E; Section 7, 8, 10, T14S, R18E, Boise Meridian.
  - B. Sawmill Canyon - Section 7, T14S, R20E, Boise Meridian.
  - C. State Section East Side Cassia - Section 16, T14S, R21E, Boise Meridian.

### ARCHEOLOGICAL

1. Literature search for sites or areas of interest and/or protection.

### HISTORY (Cultural)

1. Identify areas so as to comply with the Act governing this.

### I and I

1. Prepare I and I Plan in conjunction with District Forest Ranger.
2. A95 - State Clearing House

Inform State on what our planning effort is at this time. Provide backup information as requested by State.

### LAND USE PLANNING

1. With D.F.R., review Multiple Use Plan.
2. Identify needs for changes in Management Unit Boundaries and management decisions, revise plan as needed.

TEAM SCHEDULE FOR WEEK OF AUGUST 25 - 29, 1975

Monday, August 25:

Meet at Supervisor's Office Conference Room at 8:30 A.M. for orientation and information of required report and information needed from each specialist. Explain need for good color photos for Regional Office report. Black and white photos are needed for Environmental Statement.

Tuesday, August 26; Wednesday, August 27; Thursday, August 28:

Team to travel or go individually, or with part of the I.D. Team to gather needed information to fulfill their part of their report.

Friday, August 29:

Meet at Supervisor's Office Conference Room for critique of total team and summation for report.

DEADLINE FOR WRITTEN REPORT WITH GOOD COLOR PICTURES DUE SEPTEMBER 12, 1975  
TO TEAM LEADER, FRED BAUGH -

Individual team reports will use the following format -

1. Description of present situation (include only items pertinent to timber evaluation - but include effects of present management)
2. Describe effects of each alternative - including trade-offs (what will be gained or lost).
3. List of adverse effects that can be mitigated - including description if mitigation measures -
4. List of adverse effects that cannot be avoided - or mitigated.



POSSIBLE ALTERNATIVES FOR CASSIA TIMBER

1. Current Management
2. Intensify Commercial Harvest
  - A. 2-3 MMBF Per Year
  - B. 5-7 MMBF Per Year
  - C. 8-12 MMBF Per Year
  1. Varying degrees of T.S.I.
  2. Milling on Forest
3. Prescribed Burning and Fuelbreaks
  - A. Large acreages
  - B. Small Selected Stands
4. All-out attempt to harvest firewood
5. Mechanical treatment to reduce fire hazard
6. Combination; firewood, fuelbreaks & commercial harvest.
7. OTHERS . . . .